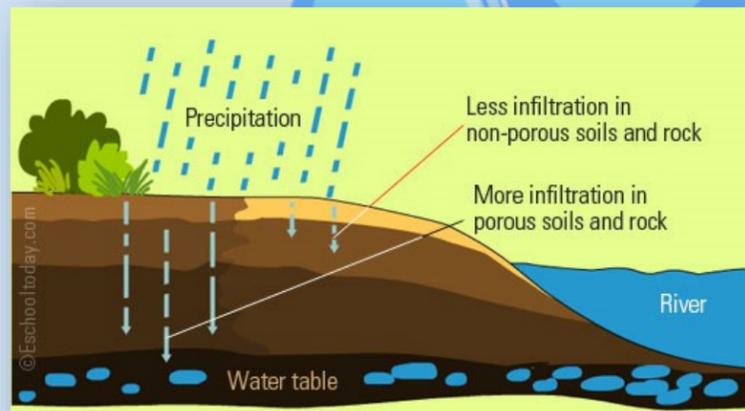


Filtration in the Water Cycle

Seventy percent of the Earth is covered with water, but only about three percent can be used for drinking water. In order to be consumable, the water needs to be free of salts, heavy metals, and other contaminants. At water treatment plants, systems are in place to filter and clean water to make it safe to drink. In the natural water cycle, water is cleaned through a process called *infiltration*.

Demonstrate it!

1. Using scissors, cut off the bottom half of a 1L plastic bottle.
2. Place the top of the bottle upside down into the bottom half. The nozzle should not touch the bottom.
3. Place cotton balls or a coffee filter inside the bottle as the first layer.
4. Over the filter or cotton, add about two inches of sand as the second layer.
5. Add about three to four inches of gravel on top of the sand.
6. Add the stones to the bottle as the final layer. Leave about a half inch of space from the top of the upside down bottle.
7. Add dirt to a glass of water to create muddy water. Consider adding other elements like leaves, twigs, or small objects.
8. Pour the glass of muddy water slowly into the bottle and watch the water infiltrate the layers of rock, gravel, sand, and cotton.
9. What do you observe? How is the water collecting in the bottom of the bottle different from the muddied water in the glass? *Don't drink the water.*



Materials

- Plastic 1L bottle
- Pebbles or stones
- Gravel
- Clean sand
- Cotton balls, or coffee filter
- Gardening dirt
- Glass of water
- Scissors



What's happening?

The natural soil of the ground filters leaves, insects, and other debris out of the water as part of the *infiltration process* of the water cycle. The Earth naturally filters water as it is absorbed into the water table underground. The majority of rainwater and melted snow is infiltrated.

For the demonstration, each layer of the homemade water filter has a purpose. Gravel and small stones are used to filter out large sediments, like leaves or insects, whereas sand and cotton is used to remove fine impurities.

